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EXAMINER	
DOUGHERTY, THOMAS M	

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2834	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/584,699	EYCKMANS ET AL.	
	Examiner	Art Unit	
	Thomas M. Dougherty	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 June 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *44-93* is/are pending in the application.

4a) Of the above claim(s) *64-93* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *44-63* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 June 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *606*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 44-55, 57, 58 and 62 are rejected under 35 U.S.C. 102(b) as being anticipated by Folen et al. (US 4,078,186). Folen et al. show (fig. 1) a device allowing magnetic property interaction, the device comprising: a layer comprising piezoelectric material (10), the layer being adapted for transporting a surface acoustic wave having a frequency V_{SAW}, and at least one ferromagnetic (col. 2, l. 9 notes iron alloy) element (12) having a ferromagnetic resonance frequency V_{VMR} and being capable of magneto-elastic energy conversion, wherein the layer comprising piezoelectric material (10) is in contact with the at least one ferromagnetic element (12) and the surface acoustic wave frequency V_{SAW} is substantially equal to the ferromagnetic resonance frequency V_{FMR} or an integer multiple of the ferromagnetic resonance frequency V_{VMR} such that the surface acoustic wave interacts with the at least one ferromagnetic element (12) to influence a magnetization state of the ferromagnetic element (12).

The device furthermore comprising at least one surface acoustic wave generating means (14, 15) for generating the surface acoustic wave having the frequency V_{SAW}.

The frequency V_{SAW} lies in a range having a width corresponding to a certain fraction of a width of an absorption peak corresponding with the ferromagnetic multiple

thereof, and which is centered around the ferromagnetic resonance frequency value V_{FMR} or around an integer multiple thereof, the fraction being 100%. Note that as the claimed structural features are met by Folen et al., the operational characteristics are met.

The integer may be an even integer number. As noted, above, the claimed structural features are met by Folen et al. thus said operational characteristic is likewise met.

The ferromagnetic element (12) is furthermore in contact (magneto-elastic coupling, col. 2, ll. 14-22) with the surface acoustic wave generating means (14, 15).

The ferromagnetic element is not in direct contact with the surface acoustic wave generating means. Note that this is considered direct physical contact.

The surface acoustic wave generating means comprises part of the layer comprising the piezoelectric material.

As noted (col. 2, ll. 14-22) the ferromagnetic element (12) is a part of the surface acoustic wave generating means (14, 15). This again is by magneto-elastic coupling.

The surface acoustic wave generating (15, 16) means comprises part of the layer comprising the piezoelectric material. Note that transducers and piezoelectric crystal form an integrated device.

The surface acoustic wave creates an effective magnetic field due to magneto-elastic energy conversion in the ferromagnetic element (12) so as to manipulate a magnetic property of the ferromagnetic element (12). As the claimed structural features are shown by the Folen et al. this is inherent in their device.

The device further comprising a means for generating an additional magnetic field (16, 18) at the ferromagnetic resonance frequency or an integer multiple of the ferromagnetic resonance frequency V_{VMR}. Note that the frequency is an intended use of the device. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Masham, 2 USPQ2d 1647 (1987).

The magnetic property is the magnetization state of the ferromagnetic element (12). Again see col. 23, ll. 14-22.

The ferromagnetic element (12) is a functional or structural part of a magnetic component. It is both functional and structural as shown in figure 1.

An angle between a direction of an easy axis of the ferromagnetic element and a direction of the effective magnetic field is different from 0°.

The surface acoustic generating means (14) is at least one Inter Digitated Transducer.

The device further comprising a surface acoustic wave detection means (15) positioned opposed to the surface acoustic wave generating means (14) with respect to the ferromagnetic element (12).

Claims 44-55, 57-59 and 62 are rejected under 35 U.S.C. 102(b) as being anticipated by Wonn et al. (US 4,586,077). Wonn et al. show (fig. 3) a device allowing magnetic property interaction, the device comprising: a layer comprising piezoelectric material (42), the layer being adapted for transporting a surface acoustic wave having a

frequency V_{SAW}, and at least one ferromagnetic (col. 5, ll.30-31 notes iron alloy) element (50) having a ferromagnetic resonance frequency V_{VMR} and being capable of magneto-elastic energy conversion, wherein the layer comprising piezoelectric material (42) is in contact with the at least one ferromagnetic element (50) and the surface acoustic wave frequency V_{SAW} is substantially equal to the ferromagnetic resonance frequency V_{FMR} or an integer multiple of the ferromagnetic resonance frequency V_{VMR} such that the surface acoustic wave interacts with the at least one ferromagnetic element (50) to influence a magnetization state of the ferromagnetic element (50).

The device furthermore comprising at least one surface acoustic wave generating means (45) for generating the surface acoustic wave having the frequency V_{SAW}.

The frequency V_{SAW} lies in a range having a width corresponding to a certain fraction of a width of an absorption peak corresponding with the ferromagnetic multiple thereof, and which is centered around the ferromagnetic resonance frequency value V_{FMR} or around an integer multiple thereof, the fraction being 100%. Note that as the claimed structural features are met by Wonn et al., the operational characteristics are met.

The integer may be an even integer number. As noted, above, the claimed structural features are met by Wonn et al. thus said operational characteristic is likewise met.

The ferromagnetic element (50) is furthermore in contact (magneto-elastic coupling) with the surface acoustic wave generating means (45).

The ferromagnetic element (50) is not in direct contact with the surface acoustic wave generating means. Note that this is considered direct physical contact.

The surface acoustic wave generating means (45) comprises part of the layer comprising the piezoelectric material (42); note that they form an integral element.

As noted the ferromagnetic element (50) is a part of the surface acoustic wave generating means (45). This again is by magneto-elastic coupling.

The surface acoustic wave generating (45) means comprises part of the layer comprising the piezoelectric material. Note that transducers and piezoelectric crystal form an integrated device.

The surface acoustic wave creates an effective magnetic field due to magneto-elastic energy conversion in the ferromagnetic element (50) so as to manipulate a magnetic property of the ferromagnetic element (50). As the claimed structural features are shown by the Wonn et al. this is inherent in their device.

The device further comprising a means for generating an additional magnetic field (52) at the ferromagnetic resonance frequency or an integer multiple of the ferromagnetic resonance frequency V_{VMR}. Note that the frequency is an intended use of the device. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

The magnetic property is the magnetization state of the ferromagnetic element (50).

The ferromagnetic element (50) is a functional or structural part of a magnetic component. It is both functional and structural as shown in figure 3.

An angle between a direction of an easy axis of the ferromagnetic element and a direction of the effective magnetic field is different from 0^0.

The surface acoustic wave generating means is at least one Inter Digitated Transducer. Note this is a typical means for generating SAWs.

The device has a second surface acoustic wave generating means. Note the plurality of transmitting transducers (45) in the figure.

The device further comprising a surface acoustic wave detection means (47) positioned opposed to the surface acoustic wave generating means (45) with respect to the ferromagnetic element (50).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 56 is rejected under 35 U.S.C. 102(b) as anticipated by either Folen et al. (US 4,078,186) or Wonn et al. (US 4,586,077) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Folen et al. (US 4,078,186) or Wonn et al. (US 4,586,077) in view of Iwaki et al. (JP 63-179582). Given the inventions of Folen et al.

and Wonn et al. as noted above, the magnetic component is not noted as a magnetoresistive device and comprises a spin valve or a tunnel junction.

Note however that as Folen et al. and Wonn et al. show the claimed structural features, said spin valve or tunnel junction are inherent in operation of the structure.

Alternatively, note that Iwaki et al. show a surface acoustic wave device on a piezoelectric material with metal layers forming a tunnel junction in a surface ascoustic wave generating region.

Iwaki et al. don't note a ferromagnetic component.

It would have been obvious to one having ordinary skill in the art to employ the functionality of Iwaki et al., that being the tunnel junction, in the device of Folen et al. or Wonn et al. at the time of their invention in order to make the device more versatile.

Claims 60 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Folen et al. (US 4,078,186) or Wonn et al. (US 4,586,077) in view Yoshizawa et al. (JP 06-069751). Given the invention of Folen et al. (US 4,078,186) and Wonn et al. neither notes that the surface acoustic wave generating means is generating a shear wave in a first surface acoustic wave propagation direction and the second surface acoustic wave generating means is generating Rayleigh waves in a second surface acoustic wave propagation direction. Thus neither shows the first surface acoustic wave propagation direction and the second surface acoustic wave propagation direction are orthogonal to each other.

Yoshizawa et al. show a surface acoustic wave generating means generating a shear wave in a first surface acoustic wave propagation direction and the second

surface acoustic wave generating means is generating Rayleigh waves in a second surface acoustic wave propagation direction.

The first surface acoustic wave propagation direction and the second surface acoustic wave propagation direction are orthogonal to each other.

Yoshizawa et al. don't show a ferromagnetic element.

It would have been obvious to one having ordinary skill in the art to employ the ferromagnetic element of either Folen et al. or Wonn et al. in the device of Yoshizawa et al., at the time of their invention, *mutatis mutandis*, in order to create the ability to "continuously vary the delay or phase shift of the surface acoustic wave", thereby making the device more sensitive and agile.

Claim 63 is rejected under 35 U.S.C. 103(a) as being unpatentable over Folen et al. (US 4,078,186) or Wonn et al. (US 4,586,077) in view of ordinary skill in the art. Given the inventions of Folen et al. and Wonn et al., they do not show a plurality of ferromagnetic elements ordered on top of one of the layer comprising piezoelectric material and the surface acoustic wave generating means. Note that it would have been obvious to one having ordinary skill in the art at the time the invention was made to show a plurality of ferromagnetic elements ordered on top of one of the layer comprising piezoelectric material and the surface acoustic wave generating means, since it has been held that constructing a formerly integral structure (in this case component 50) involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The remaining prior art cited reads on aspects of the claimed invention.

Direct inquiry to Examiner Dougherty at (571) 272-2022.

/T. M. D./ /Thomas M. Dougherty/

tmd Primary Examiner, Art Unit 2834

July 8, 2008